Proposed
California Low Emissions and Reactivity (CLEAR) Regulation For Aerosol Coating Products

Meeting of the Reactivity Scientific Advisory Committee

August 26, 1998

Riverside, California

California Environmental Protection Agency

Air Resources Board

Agenda

- RSAC Meeting on February 24
- Legal Requirements
- Proposed Regulatory Language
- Program Elements
- Updated Table of MIRs
- Schedule

Legal Requirements

- Statutory Requirement for review
- Public Process for review

Public Process to Adopt Regulations

- Staff Report and proposed Regulation released 45 days prior to October Board Hearing
- Public review during this time

Proposed CLEAR Regulation For Aerosol Coating Products Sections 94530 - 94539

- Voluntary Alternative to the Existing Aerosol Coating Regulation
- Reactivity Based VOC Limits
- Requirements Parallel Current Regulation

Section 94531 - Definitions

- VOC definition in Aerosol Coating Regulation does not apply
- Proposing 15 New Additional Definitions
  - Reactivity Related Terms

Section 94532 - CLEAR Limits

- Table of Limits
- Two Methods
  - Percent Reduction
  - Complying Products

Proposed Percent Reduction Method to Set Limits

- **Equivalence to "Percent Reduction"**
  - **Aerosol Coating Product**
  - **Current Sales-Weighted Average VOC content is 60% by weight.**
  - **Proposed Limit is 45% by weight.**
  - **Thus, a 25% mass reduction in VOC content.**

Percent Reduction Method

Steps	Example
(1) Determine % reduction to the proposed VOC limit →	Reduce emissions by 25%
(2) Calculate SWA-MIR for an Aerosol Coatings Category →	MIR_{cat} = 1.86 (g O_3/ g product)
(3) Apply % reduction to MIR of category →	Reduce MIR by 25% = (1 - 0.25) x 1.86 = 1.40 (g O_3/ g product)
(4) Result = wtd-MIR Limit for category →	Wtd-MIR Limit = 1.40 (g O_3/ g product)

Complying Market Share Method

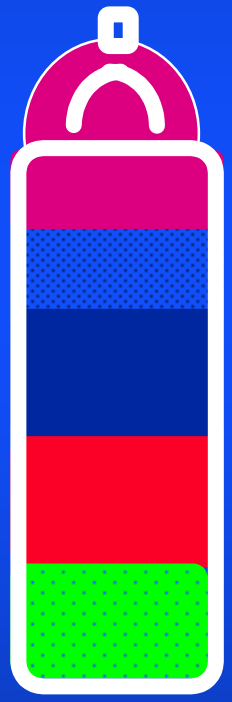
Determine the sales-weighted MIR of the complying products for the category:

= Σ(wtd-MIR for each complying product x sales)/ Σ sales

= SWA-MIR of complying products

= CLEAR Limit

Composite Paint Formula and Calculation of Weighted Reactivity



Contents	Weight Percent	MIR	Weighted Reactivity
acetone	35%	0.48	0.17
toluene	13%	4.19	0.54
propane	12%	0.64	0.08
xylene	8%	7.77	0.62
isobutane	12%	1.56	0.19
solids	20%	0	0.00
Total	100%		1.60

Product MIR_{abs} = 1.60 g O_3/g product

Section 94533 - Assignment of Maximum Incremental Reactivity (MIR) Values

- MIR value of Zero is assigned to:
  - Non-Carbon Containing Ingredients
  - CO_2, Carbonic Acid, Metallic Carbides or Carbonates, Ammonium Carbonate
  - Coating Solids
- All other VOCs assigned a MIR value

Establishing Uncertainty Factors for MIRs

- Need factors reflecting uncertainty associated with MIRs of individual compounds
- Dr. Carter's uncertainty rankings as basis
- Proposals
  - Uncertainty Bins
  - Use of Upper-Limit MIRs

Uncertainty Factor Approach

Carter Uncertainty Ranking	Uncertainty Factor
1 - 5, 9*	1.0
6 - 8, 10, 11	2.0

* Ranking of "9" infers that the current mechanism is expected to (or has been found to) over-predict reactivity.

Upper Limit Methodology

- Methodology developed by Dr. Carter of University of California at Riverside
- Published methodology based on interpretations from practical, experimental evidence
- Discussed at February meeting

Methodology

Upper-Limit MIR = Kinetic Reactivity x Mechanistic Reactivity,

where ULMIR is in units of g O_3 formed / g VOC emitted,

Kinetic Reactivity is fraction of VOC reacting (unitless), and

Mechanistic Reactivity is g O_3 formed / g VOC reacting.

Upper Limit MIR Proposal

- Propose to use methodology if no MIR value on Dr. Carter's list
- Reflects new chemical mechanism
- Affects less than one percent-by-weight of reported aerosol coating VOCs

Assigning MIRs to Hydrocarbon Solvents

- Used in aerosol coatings
- Solvents with constituents of normal, branched and cyclic alkanes, and aromatic compounds
- Goal is to identify classes or ‘bins’ and assign MIR value to each bin

Categorizing Hydrocarbon Solvents

- Binning criteria:
  - Boiling range
  - Aromatic content
  - Alkane content

Summary

- Statutory Requirement
- Voluntary Alternative to mass-based Regulation
- Equivalent O_3 Reductions

Proposed CLEAR Regulation Uses the MIR Scale

- Proposed regulation based on Dr. Carter's August 6, 1998, updated Table of MIRs
- Industry comments on list
- Review process

Aerosol Coatings Schedule

- September 4, 1998 — Release Staff Report for Proposed Regulation
- October 22, 1998 — Board Hearing